

LOCKHEED AIRCRAFT CORPORATION

PLAN OF OPERATION

For

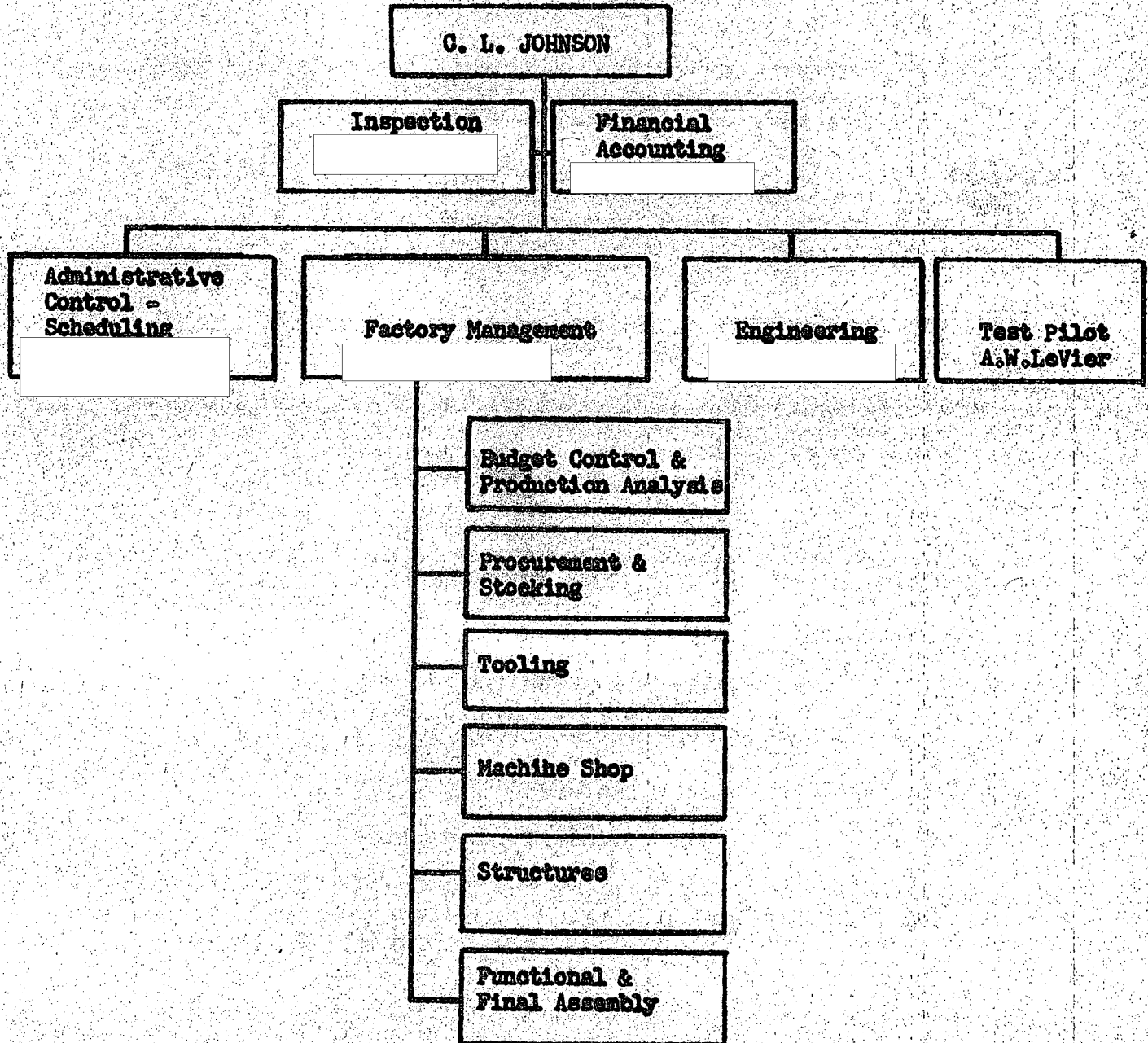
ENGINEERING EXPERIMENTAL DIVISION

January 25, 1955

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The organization developed for accomplishment of work assigned to the Engineering Experimental Division is as shown:



A summary of the responsibilities assigned to each of the respective organizational blocks shown follows:

C. L. Johnson - Direct management of all functions; liaison with the customer; initiation of security controls.

Inspection - Inspection of each element of product from raw material stage through to completion and maintenance of adequate inspection records.

Financial Accounting - Surveillance of factory procedures as they affect accounting records, receipt and payment of monies, maintenance of financial accounting records.

Administrative Control - Scheduling - Development of plans and schedules for all phases of work performed, monitor adherence to same, report progress, predict difficulties and aid in their elimination, maintain policy liaison with main factory and principal vendors.

Factory Management - Direction of Engineering Experimental Division factory operations as follows:

Budgetary Control and Production Analysis - Plan, estimate and initiate procurement of facilities. Estimate, budget, and monitor shop labor and material expenditures and analyze output.

Procurement & Stocking - Procurement of all materials, parts and services and the receiving, stocking and disbursement of same within the Experimental Division.

Tooling - Planning, designing and manufacture of mockups, tools, jigs, fixtures and shop aids needed in fabrication and assembly of the finished product.

Machine Shop - Fabrication of machined parts.

Structural Manufacture - Layout and planning of shop area, sheet metal fabrication and assembly of structural elements of product.

Functional & Final Assembly - Development and fabrication of functional components, final assembly and checkout of completed product.

A description of the functional operation of each organization is set forth below. This description excludes the scheduling, budgeting, analysis, administrative and liaison functions and discusses the flow of information from engineering through the organizations involved to the completion of the products. A discussion of accounting records is included:

ENGINEERING

All design, stress, weight, lift, aerodynamics, basic load analysis, and related engineering functions are performed within a separately guarded security area by a limited number of picked men, each of proven value in his field. Drawings do not carry title blocks as such, but are identified for shop operations as "P-3", "W-21", etc. Drawings are experimental type assembly drawings supplemented by a limited number of detailed drawings, incorporating only that information required by an experienced aircraft development mechanic to accurately reproduce the parts or assembly. Quantity of parts and spares are shown on the released drawings. Three copies of each print are released; one for inspection, one for tooling, one for fabrication and assembly.

PROCUREMENT

Prior to the release of the drawing, the Procurement group goes over the original tracing in Engineering and develops material and purchased part requirements. Procurement plans are made in accordance with the security aspects of the item. In case of any doubt as to the best course to pursue from a security standpoint, the decision is made by the manager of engineering and the manager of factory operations in collaboration. In the event it is decided that the item might be a base or a substantial part of a base for developing reasonably accurate theories as to the characteristics of the finished product by any unauthorized person, then direct purchase and direct receiving are initiated by Engineering Experimental.

On all items of a general aircraft nature which do not tend to disclose the peculiarities of the finished product, procurement paper is initiated to obtain the necessary materials from Lockheed material stores in the main factory. If the items cannot be requisitioned from existing stock, a Purchase Order Requisition is initiated for purchase of the items through normal Lockheed Purchasing Department channels. Each such Purchase Order is identified for ultimate delivery of material to an individual man at Engineering Experimental. Upon receipt at the regular Lockheed receiving dock it is automatically segregated and placed in a separate area for inter-plant pickup and delivery to the Engineering Experimental Receiving area. This has been the practice on development projects for some years.

TOOLING

One copy of the released engineering print goes to the Tooling Dept. Foreman. He reviews the print and writes the nature and number of tools required on the face of the print. He then goes over this material with the supervisor to whom he wishes to assign the job and provides him with further information such as schedule requirements and sequence of need of various tools, the type of design desired for specific tools, and any unusual aspects of the job. The supervisor makes any required tool designs and assigns the work to his man.

STRUCTURES MANUFACTURE

One copy of the released engineering print of structural work goes to the foreman of structures manufacture. He reviews the work involved, collaborates with the Tooling foreman on nature and timing of tools required, and assigns the work to a selected supervisor. Work that can be performed without tooling is commenced immediately and amplified as tools become available.

FUNCTIONAL & FINAL ASSEMBLY

One copy of the released engineering print on functional installation items goes to the foreman of Functional and Final Assembly. He reviews the work involved, collaborates with related organizations, and assigns the work to a selected supervisor. This foreman also completes the final assembly operations of rigging, electrical and hydraulic checkout, installation of equipment and final completion of the end product.

INSPECTION

One copy of the released engineering print goes to the manager of inspection operations. As parts and assemblies are completed, the assigned inspector passes on the quality of the items and conformance to engineering prints. Inspection is also made of all items arriving in the Experimental Division Receiving Area. Procedures, records and standards are maintained in accordance with applicable Air Force specifications.

On December 3, 1954, a document (copy attached) entitled Job Instruction Number 1 was developed and issued as a basis for inspection operations on Engineering Experimental and Research projects. Local Air Force and Navy Inspection offices signed the document indicating approval. The principles contained therein are being applied to the current work in Engineering Experimental, except for the indicated participation of Air Force or Navy Inspection or unauthorized Lockheed Organizations.

TEST PILOT

Flight testing to determine satisfactory performance of the completed product to the design criteria established for it will be accomplished on the initial articles. Each of the first few units will be instrumented for the phases of testing intended for that particular unit and tests will be accomplished in accordance with applicable Air Force Specifications.

FINANCIAL ACCOUNTING

1. A private ledger and detail cost accumulation accounts shall be maintained separate from Lockheed's regular books of accounts and records, by personnel assigned to this project.
2. A separate bank account has been established and is controlled by personnel assigned to this project. Payment for equipment and materials, significantly peculiar to this project, will be made through this account, plus reimbursement to the California Division for payroll, overhead and materials paid through other Division Bank Accounts. In it will be deposited all progress payments received.
3. In order to meet the strict schedule and financial requirements of this project the resources of all of Lockheed's organizations will be used to the fullest extent possible consistent with the special security requirements applicable to this project. The following organizations will perform the functions noted under their heading:

A. Payroll Accounting Department:

Will provide (1) timekeeping coverage by personnel permanently assigned to the project. (The description of the account classifications used on the timecards will not be known to personnel outside of this project.)

B. Tabulating Department:

Will provide (1) payroll distribution tapes weekly of direct labor, (2) overhead distribution weekly on applicable direct labor hours, (3) material issues tab tape weekly, and (4) direct accounts payable charges tape weekly.

C. Material Organization:

Will be called upon to perform purchasing functions or to fill our requirements from stores for common items of supplies, tooling, and production materials. Such items only will be ordered from this source which will not disclose the nature of this project.

D. Other Organizations:

The services of other California Division organizations shall be utilized to the extent deemed practical. Charges for such services shall be recorded in the project as direct or as overhead in accordance with Lockheed's standard procedures and practices.

4. Overhead

Overhead will be charged to the project on the basis of an established rate per direct labor hour for Engineering, Manufacturing and Administrative burden. The rates used for applying overhead to this project shall be the same as is used on other government projects.

5. Control of Government Property

It is the policy of Lockheed to maintain (1) accounting control, and (2) physical control, in accordance with good industrial practices and special requirements of the Aircraft Industry, of all Government property from the time of receipt until relieved of accountability either by consumption in performance of a contract, or written authorization of the cognisant government contract administrator. Contractor's detail procedures and practices applying to the subject have been approved by cognisant government representatives covering existing government contracts. Such procedures and practices as may be applicable shall be followed on this project. A more detailed summary of contractor's methods of control of government property will be supplied if required.

6. Financial Statements

For purposes of Lockheed's California Division financial statements and records, a report shall be made monthly to a responsible individual in the Division's Accounting Organization showing total receipts and disbursements in the project bank account, but no details other than as to totals of accounts affected, such as (1) net change of bank account (2) total charges to work in process, (no details) and (3) total credits to progress payments account. This is considered to be the minimum amount of information essential to reflect the Division's financial condition to meet various governmental and other requirements, but still does not reveal any information affecting the security of the project.

CALIFORNIA DIVISION

ENGINEERING EXPERIMENTAL INSPECTION GROUP

JOB INSTRUCTION #1
DECEMBER 3, 1954

INSPECTION OF EXPERIMENTAL AIRCRAFT
AND COMPONENTS PRODUCED BY THE ENGINEERING BRANCH

I. Applicable Specifications:

- A. MIL-Q-5923B Phase A (USAF) Quality Control Requirements - General
- B. AER-INS-2 Aeronautical Material Directive and T1-48 General Specification for Inspection of Material, 1 December 1951

II. Applicable Procedures:

A. Engineering Branch Procedures:

- 1. 49-15, "Receiving and Inspection of Material and Parts Procured for Engineering Experimental or Laboratory Divisions"
- 2. 66-01, "Control of Purchased Equipment"

B. Manufacturing Branch Procedures:

- 1. 33-090, "Unsatisfactory Reports for USAF QFAE"
- 2. 33-101, "Handling and Control of USAF Property Under Bailment"
- 3. 33-150, "Handling and Control of Consigned Navy Property"
- 4. 33-260, "Procurement and Receipt of Customer-Owned Property"
- 5. 33-280, "Lost, Damaged or Destroyed Government Property - USAF"
- 6. 52-210, "Purchase Order Specification Requirements"
- 7. 81-066, "Precision Inspection Measuring Devices - Inspection"
- 8. 81-080, "Inspection and Disposition of Airplane Products"
- 9. 81-505, "Soldering Ability Test"
- 10. 81-510, "X-Ray Inspection of Gas-, Arc-, Spot-, and Flash-Welded Parts and Assemblies"
- 11. 81-620, "Certification and Qualification of Spotweld and Flashweld Machines"

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- C. The detail applicability of the procedures referenced in II.A. and II.B. above shall be as specified in the subsequent paragraphs of this Job Instruction.

III. Engineering Branch Organizations Affected:

- A. Engineering Experimental Division (Experimental) located at Plant B-6
- B. Engineering Laboratory Division (Laboratory) located at Plant B-1
- C. Engineering Experimental Inspection Group which provides Lockheed inspection coverage for the Experimental and Laboratory Divisions

IV. Purpose:

- A. This Job Instruction provides written descriptions of the procedures used in implementation of the requirements of the applicable phases of the referenced specifications which relate to the system for inspecting experimental aircraft and related components.

V. Quality Control System:

A. General:

1. The Engineering Experimental Inspection Group shall:

- a. Inspect all airplane products and components, produced or procured by the Experimental and Laboratory Divisions, at predetermined points or at other times when necessary to enable detection of discrepancies sufficiently early in the manufacturing process to prevent unnecessary costs.
- b. Accept airplane products and components that conform to:
 - (1) Established workmanship standards.
 - (2) Engineering drawings or sketches.
 - (3) Related engineering or contract specifications.
- c. Withhold from use items that do not conform to the standards and specifications listed in V.A.1.b. above.
 - (1) If the items are incomplete or require minor rework the Engineering inspector shall inform the responsible shop supervisor (or his leadman) and return the items for the required rework.

- (2) If the items produced at Engineering Experimental contain minor discrepancies (variations resulting from workmanship errors, etc., which do not adversely affect safety, performance, durability or weight), they shall be referred to the supervisor of Engineering Inspection for disposition. At the Engineering Laboratory, such discrepancies shall be referred to the Lead Inspector for that area; if agreement as to disposition cannot be reached, the matter shall be referred to the supervisor of Engineering Inspection for decision. In handling minor discrepancies "D" and "detail" stamps shall be used as is done by the Manufacturing Inspection organization.
- (3) If the items are to be scrapped they shall be stamped "scrap" and deposited in a container provided for that purpose.
- (4) Items that require engineering disposition shall be written in rejection form on "Inspection Rejection, LAC Form #1116-3". The disposition shall be written in the block provided and shall be signed by the engineer and by the supervisor of Engineering Inspection. The shop supervisor shall be informed at that time of the required rework. When rework is accomplished, an acceptance stamp shall be placed on the items. When Customer inspector visits the area he shall be asked to review these rejections and indicate approval by stamping in the disposition block of Form #1116-3.

d. Ensure that all finished and acceptable items bear a part number and stamp items that conform to all print requirements and applicable specifications with the round detail stamp of the Engineering Experimental Inspection Group.

B. Purchased Parts and Material:

1. Receiving and inspection of parts and materials procured by Engineering Experimental and Laboratory Divisions shall be performed by the Engineering Experimental Inspection Group in accordance with Engineering Procedure 49-15.
2. Raw material shall, when practicable, have a test report or certificate of conformance identifiable with the material. In the event that no such report or certificate is available, samples shall be taken and tests performed at Lockheed to determine that the material meets applicable specification.
3. Raw material shall be identified per LAC Process Bulletin 151.
4. Purchased parts shall be examined as to part number and condition. If prints are not available, the engineer responsible for ordering the part shall be required to identify it and agree that it is acceptable for his intended usage.

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5. The responsible engineer shall determine those purchased parts (normally items of functional equipment) that require functional testing. Functional tests may be performed at time of receipt of the item by the Manufacturing Branch functional test facilities if the necessary Functional Test Procedure and equipment exist or the test may be performed by the Engineering Laboratory on the basis of the test requirements provided by the responsible engineer. The performance of functional tests shall be recorded and the parts shall be appropriately marked by stamp or decal. At the discretion of the responsible engineer, functional test at time of receipt may be waived if the item in question is subject to a subsequent system test.
6. If determined to be applicable to a particular project, the handling of purchased equipment shall conform to Engineering Procedure 66-01.

C. Source Inspection:

1. Normally, Government source inspection will be conducted on supplies that affect the safety or performance of the end item. Source inspection may be waived by the Customer when sufficient inspection and tests of purchased parts, components and assemblies are performed in Engineering Experimental or the Engineering Laboratory to indicate that the subject items conform to requirements of the contract.
2. The indication of source inspection requirements on procurement and receiving documents shall be in conformance with Manufacturing Procedure #52-210.
3. The Engineering Experimental Inspection Group in performing receiving inspection shall verify that source inspection requirements are met.
4. If it is determined that all requirements of the Purchase Order are met except source inspection, Engineering Inspection shall request the Purchasing Department to wire the vendor asking for confirmation by return wire, or by a properly executed packing sheet, that the parts are satisfactory and that source inspection approval was inadvertently omitted.
 - a. When the vendor's answer is in the affirmative and the Customer inspector agrees, the Receiving Memo shall be signed off so that the parts can be used and the vendor may be paid.
 - b. When the vendor's answer is in the negative, there are two solutions:
 - (1) Obtain the necessary information and perform source inspection at Lockheed.
 - (2) Send parts back to vendor for source inspection.

The decision as to which of the above solutions shall be used will depend upon the particulars of the case in question and shall be jointly determined by Lockheed and USAF Quality Control.

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D. Inspection Measuring and Testing Equipment:

1. Measuring and testing devices used for inspection purposes shall be handled and controlled in accordance with Manufacturing Procedure #81-066.

E. Special Processes:

1. Special processes shall in general conform to applicable Lockheed Engineering Process Specifications and Process Bulletins.
2. The X-Ray inspection of gas-, arc-, spot-, and flash-welded parts and assemblies shall be in accordance with Manufacturing Procedure #81-510.
3. The certification and qualification of spotweld and flashweld machines shall be in accordance with Manufacturing Procedure #81-620.
4. The certification of aircraft welding personnel shall be in accordance with Manufacturing Procedure #81-630.
5. Soldering ability tests shall be in accordance with Manufacturing Procedure #81-505.

F. Government-Furnished Property:

1. The procurement and receipt of Government-Furnished Property shall be in accordance with Manufacturing Procedure #33-260.
2. The inspection of Government-Furnished Property shall be in accordance with Manufacturing Procedure #81-080.
3. Lost, damaged, or destroyed Government-Furnished Property shall be handled in accordance with Manufacturing Procedure #33-280.
4. Defective material reports for Government-Furnished Property shall be in accordance with Manufacturing Procedure #33-090.

G. Bailed Property:

1. Bailed property shall be handled in accordance with Manufacturing Procedure #33-101. (Consigned property shall be in accordance with Manufacturing Procedure #33-150.)

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H. Work Performed for Production Departments:

1. Aircraft and related components produced by Experimental or the Laboratory for the Manufacturing Branch shall be handled in accordance with the preceding paragraphs.

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Engineering Experimental
Inspection Supervisor

APPROVED:

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AF Plant Representative
Quality Control Branch

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Bureau of Aeronautics Representative
Inspection Division